Research Synopsis

Spatial Pattern For Urban Greenery Space Planning

Submitted By

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1. Introduction

Today's world facing the problems caused by urbanization, global climate change, increasing population and developmental activities which puts the pressures on environment ecosystem. To address such kind of issue collaborative, long-term, strategic urban green space management planning become necessary, which support proactive management approaches This leads us to get the results in the form of increased operational efficiency, risk reduction, increased urban forest canopy and leaf area. This has enforced to create greenery spaces with urbanization and developmental activities which will enable us to accept the complex problems related to above mentioned problems. Various planning processes have been introduced with a synergistic planning approach act as a key factor for reducing urban heat and its associated effects. While planning the urban environment, it is very important understand the fundamental needs of urban area. How to preserve the green infrastructure, how long it required the planning, how to implement such plans such questions should be focused while developing any plan for urban green space. The relations should be balanced between the urban development and green Problems regarding with decision making and resources allocation are handled by planning through the world needs suitable information for development activities. The use of technical development plan can improve the environmental debasements of urban area with appropriate maintenance. The Technology can serve competently by plural ways while dealing with these issues. The creation of greenery space involves complex decision making process. It demands several inputs about soil, air, water, fertilizers, diseases, preventive measures etc. The decision making for Greenery Space Planning may be supported by applying Geographical Information System (GIS) and Data mining techniques.

Today's technical world uses the GIS technology with digital information, various methods of data creations and data digitization's are used to transferred the information through digital methods. GIS looks like a database program but it differ from database structure by including geography which make it possible to spot the data onto map and query [5]. With the support of technical tool like GIS and Data mining it is possible

make intelligent decision to perform sophisticated calculation for analysis purpose. Spatial data mining is rapidly producing new possibilities for gathering, analyzing and presenting geographical data by extending their capabilities to discover hidden patterns in databases. The objective of this research work is to introduce data mining over geographically collected data .One key to a sustainable future within the changing world is access to spatial information and to reach information by data mining that leads to better decision-making. This is not possible without building and maintaining spatial data infrastructures and data mining technology. Especially spatial data mining technology is critical to a number of application domains, including spatial and environmental planning, public health and safety, climatology, transportation, and mobile-commerce. Spatial data mining can be defined as the search of patterns that could exist in databases of spatial data infrastructures. Spatial data are critical to promote economic development, improve our responsibility of natural resources and to protect the environment. Extracting interesting and useful patterns from spatial datasets is more difficult than extracting the corresponding patterns from traditional numeric and categorical data due to the complexity of spatial data types, spatial relationships, and spatial autocorrelation.

Geographical Information Systems based planning support tools and Data mining techniques have been widely used in recent years for dealing with the decision making process and planning support. Basically these techniques are more useful to discover the relationship between urban attributes. While discovering relationships between urban attributes, data mining can constitute a methodology for the analysis of multi-dimensional relational complexity of urban environments. Considering the present scenario of urban environmental pollution, there is a growing need for changing the approach of planting trees and other plant species .The aim of this study is to find out the conceptual framework for urban greenery planning. The present investigation proposes a GIS based model along with data mining techniques which will summarizes a strategy for supplying the ecosystem services for urban area through the required planning process. The model will also allow easier adaptation for Local Government and for other similar communities wishing to implement standard policies for Green City / Green India programs.

1.1 Motivation

Today's world facing the problem of rapid urbanization and global climate change, increasing population and economic activities which puts the pressure on available trees. One cannot ignore the urban tree and green space who are the efficient scavengers of particulate which play an important role in our rapidly growing life. The emerging experience and ongoing action research in the world on climate change, urban forestry and rewards for environmental services can become a cornerstone. The research can create effective, efficient and fair incentives for enhancement of the environment. Trees are the natural resource provider which having global ecological as well as socio-economic resources also improve our air quality, improve our economical sustainability, protect our natural water resources, and reduce our energy consumption required a sustainable planning. In sprang up countries local government has adopted the various tree planting technique which leads to reduce the global warming effect on human life. It has been seen that in developing countries like INDIA, a lack of proper tree planning leads problems in urban development and fragmentation which motivate me to study about spatial pattern for urban greenery space planning.

1.2 Statement of Problem

Previous studies had suggests that one of the major causes of the loss of urban greenery is urbanization. While other studies have introduced that deficiency of coordination in between spatial planning and environmental management results in conflicting objectives. The problem of losing urban tree and green space occurs due to lack of skills, adequate information, limitations, unavailability of human and financial resources which leads to poor spatial analysis and poor management results in conflicting objectives.

Many actions intended to deal with a problem have contributed basic principles. The problem of statement of this study determine essential quality for proper model which offer the solution for the problem of spatial pattern of urban greenery using GIS and data mining techniques. Current policies may need corrections to shift from exclusive attention for environmental services to promote tree-based option.

2 Literature Review

Various studies have been introduced in the GIS research area. As a result these studies show the verity of GIS applications that stretched walk of life. By understanding these applications which are accommodative for understanding of selection of problem, methodology and plans. Some of them are more applicable to the proposed problem are presented.

In (1) Laura Poggio specifies that the environmental effects ,possible risk ,land use restrictions ,cost /benefit assessment and soil remediation strategies needs to be integrated in a spatial planning procedure .he also explore the ways, possibilities and benefits of the spatial implementation of the urban green space planning .He also concluded that the spatial information can be used to steer the planning process ,to assess the needs and potential impact of land use planning ,to design the necessity ,to set the priority of remedial action and to improve the planning decision.

In (2) Remote sensing data and GIS techniques were used by Atiqur Rahman which has provided the detail information about the environmental information to develop the database system to design the DSS system. To develop a DSS with digital database RS and GIS play an important role to get the information of urban environmental management. Author also think that the GIS and RS technique will encourage the people to design the proper plan and decision making process for the improvement of environmental quality of urban area.

In (3) Author selected a case study based on Huaibei city using GIS based network analysis for the evaluation of current situation and planning of green space system . Author also introduced the landscape analysis software Fragstats which uses the method of landscape pattern analysis is an effective track to evaluate green space system planning along with the network analysis which leads improve the quantity and quality with systematic green space of urban area. The result of this study concluded that with

the help of GIS based network analysis and landscape pattern analysis is helpful for ecological networking of the city.

In [4] Qing Chang (2011) introduced GAP analysis in which planning technique were integrated using GIS through which urban planners can analyze the gaps of the requirement of urban public green spaces and their distribution. The analysis method was applied for the identification of pedestrian service gaps of urban green spaces. Easy operated accessibility evaluation method was applied by the author which were based on the green space and data transportation through Cost distance model in GIS. The result of this study has shown the planning strategies workout which involves the dispersed neighborhood parks and the aggregative country parks projects.

In [6] Author designed SDSS to determine optimum sites for physical developments within the built environment. The SDSS developed took into consideration existing and future planning scenarios with the aim of creating a sustainable built environment. To do this, a framework for capturing existing land use was generated and the SDSS used to generate physical development expansion scenarios of the Obafemi Awolowo University, Nigeria. The application of this system shows that planning especially as it relate to the urban environment can be made more flexible, dynamic and responsive to timely decisions on geographic space. The results of the spatial analyses show among other things the need to refocus development in the urban built outside the core areas for efficiency and sustainability of the near balance between physical development and the natural environment.

In [7] Urban green infrastructure supports resilience in cities and promotes sustainable resource management. As per authors opinion Small green areas, including school green areas (SGAs), are an important component of urban green infrastructure which play a key role in supplying cities with educational services. This article author described how SGAs can amplify an urban green area's connectivity and multifunctionality. The analysis was performed in Bucharest as a case study. A survey based on questionnaires was used to obtain data regarding green spaces within public schools. Using parametric and nonparametric statistical analysis, author identified the variables that determine an SGA's presence and size. Potential connectivity assessment results showed that most of

the schools that lack or have small-sized SGAs have the possibility to cover their green space deficit by developing activities within nearby public green spaces. The increased connectivity and multifunctionality of urban green infrastructure through small, specialized green areas, such as SGAs, is an indicator of the fact that such areas can be used to ameliorate the deficit of green space in major urban areas

In [8] A GIS-based method for locating potential tree-planting sites based on land cover data is introduced. Criteria were developed by Chunxia Wu to identify locations that are spatially available for potential tree planting based on land cover, sufficient distance from impervious surfaces, a minimum amount of pervious surface, and no crown overlap with other trees. In an Arc GIS environment, a computer program was developed to iteratively search, test, and locate potential tree planting sites by virtually planting large, medium and small trees on plantable areas, with large trees given priority as more benefits are expected to accrue to them. The result of this study has found that smaller trees are more susceptible to land cover classification errors. This can be improved in the future by setting more strict rules for selecting planting sites.

3. Research Outline

This section will examine the research question, aim, objectives, scope, significance, limitations and the justifications for this study.

3.1Research Question

The question analyze by this study is:

- "Whether this study is able to justify the spatial analysis for urban green space planning".

It hypothesized that an improvement in consumption required a sustainable planning. . Using GIS and Data mining techniques one can able to perform spatial analysis and capable of highlighting issues and problem for planning, monitoring and management of urban greenery.

3.2 Aim

The aim of this study is to find out the conceptual framework for urban greenery planning. This framework will focus on the proper urban tree and green space planning which assist to expert and non -expert user.

3.3 Objectives

Following are the objectives of this study

- To explore in brief GIS and Data mining technology with its Spatial Analyst, and it's potential to be an effective tool for urban tree and green spaces.
- To collect the information and datasets about the study area this has significance from the ecological planning perspective.
- To demonstrate a methodology.
- Identification of priority sites where more sensitive development needs to occur.
- To recommend possible intervention actions and suggestions for future land use of the study area.

Objective will be modified as per data availability.

3.4 Significance

This research will propose an innovative model which has a solid foundation. We need to integrate a green space planning in urban area and provincial development plans.

The major contribution of this study highlights the following points.

- This study helps to avoid a monoculture of tree species inside the city limits.
- It is able to develop spatial and statistical queries.
- It is able to identify and locate hotspot.
- The urban green space planning can potentially increase the attractiveness of the city.
- It provides locations that are open for the planting of new trees.

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3.5 Research Methodology

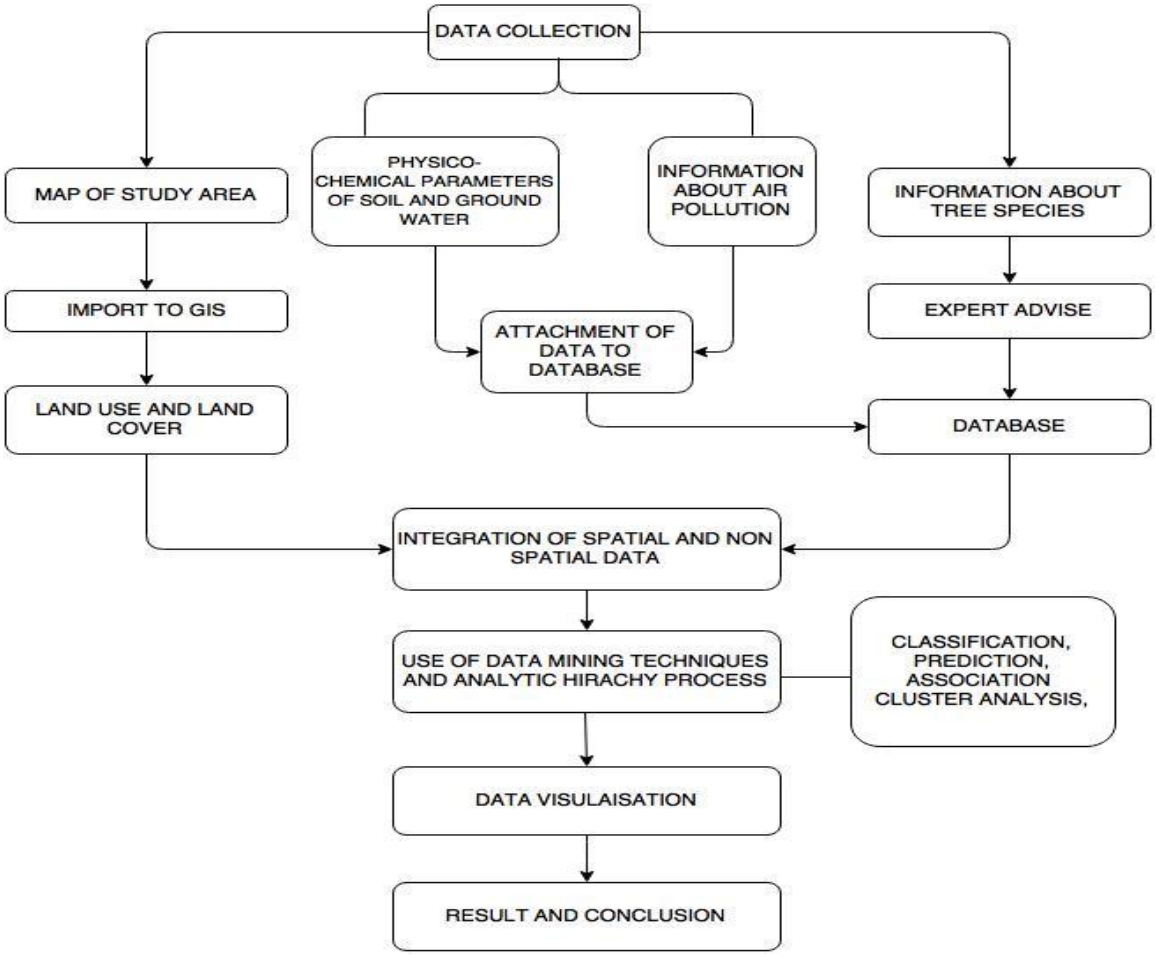
DATA COLLECTION
MAP OF STUDY AREA
PHYSICO-CHEMICAL PARAMETERS OF SOIL AND GROUND WATER
INFORMATION ABOUT AIR POLLUTION
INFORMATION ABOUT TREE SPECIES
IMPORT TO GIS
ATTACHMENT OF DATA TO DATABASE
EXPERT ADVISE
LAND USE AND LAND COVER
DATABASE
INTEGRATION OF SPATIAL AND NON SPATIAL DATA
USE OF DATA MINING TECHNIQUES AND ANALYTIC HIRACHY PROCESS
CLASSIFICATION, PREDICTION, ASSOCIATION CLUSTER ANALYSIS,
DATA VISULAISATION
RESULT AND CONCLUSION

Fig. 1: Methodology for Spatial pattern of urban greenery space planning

This methodology is applied for the development of spatial pattern of urban greenery space planning. The result from overall stage will lead to minor refinements of the original theoretical framework and it will also provide the new research question for future work. The methodology will be change as per research requirement to achieve objectives.

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Research Guide

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